Solving with factoring

When you can't just plug in the value you're evaluating, your next approach should be factoring.

Example

Evaluate the limit.

$$\lim_{x \to 4} \frac{x^2 - 16}{x - 4}$$

Just plugging in 4 would give us a nasty $0/0$ result. Therefore, we'll try factoring instead.

$$\lim_{x \to 4} \frac{(x + 4)(x - 4)}{x - 4}$$

Canceling $(x - 4)$ from the top and bottom of the fraction leaves us with something that is much easier to evaluate:

$$\lim_{x \to 4} x + 4$$

Now the problem is simple enough that we can use substitution to find the limit.

$$4 + 4$$

$$8$$

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